

## REMARKS

The Examiner is thanked for her careful and very thorough Office Action. The Examiner is particularly thanked for the helpful suggestions regarding correction of the alleged informalities. Claims 2, 3, and 11-13 have been objected to. Claims 1, 4-10, and 14-18 have been rejected. By the foregoing amendments, various Claims are sought to be amended or canceled without prejudice. Note that the amendments to Claims 1 and 9 are intended to be purely formal amendments, and are believed not to change the scope of these claims.

Claims 6 and 14 are arguably being narrowed at this time (as are the corresponding dependent claims). However, Applicant is not disclaiming nor permanently relinquishing any subject matter, and reserves the right to prosecute such claim scope further in a continuing application.

The foregoing amendments to the specification are submitted to improve clarity, and to remove various typographical and other minor informalities. These changes are respectfully asserted not to introduce new matter, and their entry is respectfully requested.

### Art Rejections

The art rejections are all respectfully traversed.

### *Review of the References*

*Zaleski et al.* merely teaches an instrumented bit, and does not remotely suggest that sensors should be located anywhere except in the bit, nor that sensors should not be located in the bit.

*Daly et al.* indicates a failure condition by dropping the drilling fluid pressure from one state to another. *Daly et al.* does not suggest or disclose a final step of returning the drilling fluid pressure to its first state.

*McCullough* indicates a failure condition by an increase in drilling fluid pressure. The present invention indicates a failure condition by a drop in drilling fluid pressure.

*Robbins* does not monitor bit condition or disclose the use of sensors. *Robbins* simply uses a combination of transmitters and receivers to gain information about the formation surrounding the borehole.

***Rejections Under 35 USC 102(b)***

***Claims 1, 4-5, and 14 stand rejected under 35 USC Section 102(b) as anticipated by Zaleski, Jr. et al.***

*Zaleski et al.* merely teaches an instrumented bit, and does not remotely suggest that sensors should be located anywhere except in the bit, nor that sensors should not be located in the bit. (Indeed, *Zaleski et al.* appears to teach away from the concepts described in the present application.)

Therefore, *Zaleski et al.* requires the use of a drill bit having sensors that are capable of communicating with the measurement and communication system. *Zaleski et al.* does not relate to having a sub assembly that operates independently of the sensors on the drill bit.

In fact, the present application specifically addresses the disadvantages of instrumented drill bits:

It appears that some work has been done on placing sensors directly in the drill bit assembly to monitor the bit condition. There is some merit in placing sensors in the bit assembly, but this methodology also has some distinct disadvantages. The main disadvantage is the necessity of redesigning every bit which will use the method. In addition to being costly, each new bit design will have to accommodate the embedded sensors which might compromise the overall design. A second disadvantage arises from the fact that sensor connections and/or data transmission must be made across the threaded connection on

the bit to a data processing or telemetry unit. This is difficult in practice. (page 2, line 26 - page 3, line 6)

Therefore, Applicant respectfully submits that Claims 1, 4-5, and 14 are not anticipated by *Zaleski et al.*

The claim language of Claim 1 is not met. Specifically, Claim 1 recites "a plurality of sensors located on a downhole section of a drill string." As stated above, *Zaleski et al.* discloses an instrumented bit. This reference does not suggest or disclose locating sensors anywhere but in the drill bit itself.

According to the Federal Circuit:

For a prior art reference to anticipate a claim, the reference must disclose each and every element of the claim with sufficient clarity to prove its existence in the prior art.

*Motorola, Inc., v. Interdigital Tech. Corp.*, 43 USPQ 2d 1481, 1490 (Fed. Cir. 1997). Therefore, a prima facie case of anticipation has not been established by the Examiner. Accordingly, Applicant respectfully requests withdrawal of this rejection.

Claim 14 also recites features not shown or suggested by *Zaleski et al.* Specifically, Claim 14 recites "downhole circuitry to signal a change in downhole equipment condition by causing a reduction in drilling fluid static pressure." *Zaleski et al.* signals drill bit condition by reducing drilling fluid dynamic pressure, not static pressure. Therefore, for the reasons discussed above, Applicant respectfully requests withdrawal of this rejection.

Finally, dependent Claims 4, 5, and 18, which depend directly from independent Claims 1 and 14 and incorporate all the limitations thereof, also include additional limitations that are not shown or suggested by *Zaleski et al.*

For example, dependent Claim 18 recites “**sensors located on the drill string.**”

Thus, for these reasons, and for the reasons discussed above, Applicant respectfully requests withdrawal of this rejection.

***Claims 6-10 stand rejected under 35 USC Section 102(b) as anticipated by Daly et al.***

*Daly et al.* indicates a failure condition by dropping the drilling fluid pressure from one state to another. The present invention not only drops the drilling fluid pressure from one state to another, but also includes the additional step of returning the drilling fluid pressure to its first state. *Daly et al.* does not suggest or disclose a final step of returning the drilling fluid pressure to its first state.

Therefore, Applicant respectfully submits that Claims 6-10 are not anticipated by *Daly et al.*

The claim language of Claim 6 is not met. Specifically, Claim 6 recites “**a final state, which returns mud flow impedance to substantially that seen during normal drilling.**” As stated above, *Daly et al.* does not disclose or suggests returning the drilling fluid pressure to its initial state.

Therefore, a prima facie case of anticipation has not been established by the Examiner. Accordingly, Applicant respectfully requests withdrawal of this rejection.

Claim 10 also recites features not shown or suggested by *Daly et al.* Specifically, Claim 10 recites “**halting drilling ... sensors located on a downhole sub assembly.**” *Daly et al.* does not suggest or disclose a method by which drilling is halted. This reference merely drops drilling fluid pressure once certain conditions are met. *Daly et al.* also does not disclose having sensors located anywhere but in the drill bit itself. Therefore, for the reasons discussed above, Applicant respectfully requests withdrawal of this rejection.

Finally, dependent Claims 7-9, which depend directly from independent Claim 6 and incorporate all the limitations thereof, also include additional

limitations that are not shown or suggested by *Daly et al.* For example, dependent Claim 8 recites **"valve movement occurs at a time constant of at least about one second."**

Thus, for these reasons, and for the reasons discussed above, Applicant respectfully requests withdrawal of this rejection.

***Claims 6-10 and 14-17 stand rejected under 35 USC Section 102(b) as anticipated by McCullough.***

*McCullough* indicates a failure condition by an increase in drilling fluid pressure. The present invention indicates a failure condition by a drop in drilling fluid pressure.

Therefore, Applicant respectfully submits that Claims 6-10 and 14-17 are not anticipated by *McCullough*.

The claim language of amended Claim 6 is not met. Specifically, Claim 6 recites **"a valve which reduces mud flow impedance."** *McCullough* does not disclose or suggests reducing mud flow impedance.

Therefore, a prima facie case of anticipation has not been established by the Examiner. Accordingly, Applicant respectfully requests withdrawal of this rejection.

Claim 10 also recites features not shown or suggested by *McCullough*. Specifically, Claim 10 recites **"sensors located on a downhole sub assembly."** *McCullough* does not suggest or disclose locating sensor anywhere but in the drill bit itself. Therefore, for the reasons discussed above, Applicant respectfully requests withdrawal of this rejection.

Amended Claim 14 also recites features not shown or suggested by *McCullough*. Specifically, Claim 14 recites **"using downhole circuitry to signal a change in downhole equipment condition by causing a reduction in drilling fluid static pressure."** As discussed above, *McCullough* only teaches a method of increasing drilling fluid pressure to indicate bit failure. It does not suggest or disclose dropping drilling fluid pressure. Therefore, for the reasons discussed above, Applicant respectfully requests withdrawal of this rejection.

Finally, dependent Claims 7-9 and 15-17, which depend directly from independent Claims 6 and 14 and incorporate all the limitations thereof, also include additional limitations that are not shown or suggested by *McCullough*.

Claim 9 recites "**mud flow impedance is varied by opening an aperture.**" *McCullough* varies mud flow impedance by restricting an aperture, not opening it.

Claim 16 recites "**cycling a valve through a position which reduces fluid pressure.**" *McCullough* cycles a valve through a position which increases fluid pressure.

Thus, for these reasons, and for the reasons discussed above, Applicant respectfully requests withdrawal of this rejection.

#### ***Rejection Under 35 USC 103(a)***

***Claim 18 stands rejected under 35 USC Section 103(a) as being unpatentable over Zaleski et al. in view of Robbins.***

As stated earlier, *Zaleski et al.* merely teaches an instrumented bit. It does not suggest or disclose locating sensors anywhere but in the drill bit itself. *Robbins* does not suggest or disclose the use of sensors at all, much less in the drill string. In fact, *Robbins* appears to teach away from the concepts described in the present application:

*...the present invention relates to a drill string tool measuring sonic parameters of the formation and a system for eliminating errors associated with the mechanical packaging of the necessary sensors. (col. 1, lines 8-11)*

Instead of sensors, *Robbins* uses a combination of transmitters and receivers to gain information about the formation surrounding the borehole.

Therefore, Applicant respectfully submits that Claim 18 is patentable over *Zaleski et al.* in view of *Robbins*.

The claim language of Claim 18 is not met. Specifically, Claim 18 recites "**sensors located on the drill string.**" Neither *Zaleski et al.* nor *Robbins*, singly or in combination with one another, suggests or discloses the placement of sensors in a drill string.

According to the Federal Circuit:

Determination of obviousness can not be based on the hindsight combination of components selectively culled from the prior art to fit the parameters of the patented invention. There must be a teaching or suggestion within the prior, or within the general knowledge of a person of ordinary in the field of the invention, to look to particular sources of information, to select particular elements, and to combine them in a way they were combined by the inventor.

**ATD Corporation v. Lydall, Inc.**, 48 USPQ 2d 1321, 1329 (Fed. Cir. 1998). Therefore, a prima facie case of obviousness has not been established by the Examiner. Thus, for the reasons discussed above, Applicant respectfully requests withdrawal of this rejection.

**Conclusion**

Thus, all grounds of rejection and/or objection are traversed or accommodated, and favorable reconsideration and allowance are respectfully requested. The Examiner is requested to telephone the undersigned attorney or Robert Groover for an interview to resolve any remaining issues.

Respectfully submitted,



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